

**U.S.ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY
540 S. MORRIS AVE., MONTGOMERY, AL 36115
RA226 ANALYSES**

REPORT OF SAMPLE DELIVERY GROUP #1100248

Project: Dimock Residential GW Site, Dimock, PA
Analysis method: Radium-226 in Water: Rapid Method for High-Activity Samples
Report ID: 1100248-RA226
Report type: Original
Date reported: 04/10/2012
Total pages in report: 30

SAMPLES

NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B2.01731G	HW49	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01732H	FB14	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01733J	HW21Z	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01734K	HW22	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01735L	HW44	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/13/2012
B2.01736M	HW36N	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012
B2.01737N	HW54	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012
B2.01761N	HW55	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/14/2012
B2.01762P	FB16	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/14/2012
B2.01763Q	HW27	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/14/2012
B2.01777X	FB17	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01778Y	HW57	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01779Z	HW03	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01780R	HW03Z	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01781T	HW58	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01782U	HW11	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/15/2012
B2.01783V	HW27Z	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/15/2012
B2.01784W	HW53	PA:DIMOCK	WATER-DRINKING	02/13/2012	02/15/2012
B2.01785X	HW59	PA:DIMOCK	WATER-DRINKING	02/14/2012	02/15/2012
B2.01877A	HW07	PA:DIMOCK	WATER-DRINKING	02/15/2012	02/16/2012

EXCEPTIONS

1. **Packaging and shipping** – No problems were observed.
2. **Documentation** – NAREL originally agreed to analyze 71 samples for this project, but sample collectors collected and shipped more samples than expected. NAREL then agreed to analyze 100 samples, which would make five batches of 20 for QC purposes. Actually 101 samples were received. With the client's permission, NAREL did not analyze the field blank received in the last shipment thus making the agreed upon total of 100 samples for analysis.
3. **Sample preparation** – No problems were encountered.
4. **Analysis** – No problems were encountered.
5. **Holding times** – No holding times were specified.

QUALITY CONTROL

1. **QC samples** – All QC analysis results met NAREL acceptance criteria.
2. **Yields** – All chemical yields were within acceptance limits.
3. **Instruments** – Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.

CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary Wisdom
Mary F. Wisdom
Quality Assurance Manager, NAREL

4-12-12
Date

for John G. Griggs (Acting CERL Dr)
John G. Griggs, Ph.D.
Director, Center for Environmental Radioanalytical
Laboratory Science

4-12-12
Date

GENERAL INFORMATION

SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

ANALYSIS SUMMARY

Analysis Procedure: NAREL RA226-EICHROM
Title: Radium-226 in Water: Rapid Method for High-Activity Samples

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
B2.01731G	DUP	N/A	04/05/2012	0015862U	0008615C
B2.01732H		N/A	04/06/2012	0015862U	0008615C
B2.01733J		N/A	04/05/2012	0015862U	0008615C
B2.01734K		N/A	04/05/2012	0015862U	0008615C
B2.01735L		N/A	04/05/2012	0015862U	0008615C
B2.01736M		N/A	04/05/2012	0015862U	0008615C
B2.01737N		N/A	04/05/2012	0015862U	0008615C
B2.01761N		N/A	04/06/2012	0015868A	0008615C
B2.01762P		N/A	04/06/2012	0015868A	0008615C
B2.01763Q		N/A	04/06/2012	0015868A	0008615C
B2.01763Q		N/A	04/06/2012	0015868A	0008615C
B2.01777X		N/A	04/06/2012	0015868A	0008615C
B2.01778Y		N/A	04/06/2012	0015868A	0008615C
B2.01779Z		N/A	04/06/2012	0015868A	0008615C
B2.01780R		N/A	04/06/2012	0015868A	0008615C
B2.01781T		N/A	04/07/2012	0015872W	0008615C
B2.01782U		N/A	04/07/2012	0015872W	0008615C
B2.01783V		N/A	04/07/2012	0015872W	0008615C
B2.01784W		N/A	04/07/2012	0015872W	0008615C
B2.01785X		N/A	04/07/2012	0015872W	0008615C
B2.01877A		N/A	04/07/2012	0015872W	0008615C
LCS-00634903F *	LCS	N/A	04/07/2012	0015872W	0008615C
RBK-00634902E *	RBK	N/A	04/05/2012	0015862U	0008615C

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

PREPARATION METHOD(S) USED

Procedure ID	Title

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01731G	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS105	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.06e-01	8.6e-02	6.5e-02	PCI/L	04/03/2012 14:45 CDT

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01732H	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS107	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	4.59e-02	6.2e-02	6.6e-02	PCI/L	04/03/2012 14:34 CDT

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01733J	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS107	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	7.77e-02	7.7e-02	6.7e-02	PCI/L	04/03/2012 14:46 CDT

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01734K	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS108	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	5.94e-01	2.1e-01	6.9e-02	PCI/L	04/03/2012 15:55 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01735L	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS109	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.29e-01	9.6e-02	8.5e-02	PCI/L	04/03/2012 14:38 CDT

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SAMPLE ANALYSIS REPORT

Sample #:	B2.01736M	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS110	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.77e-01	1.1e-01	8.7e-02	PCI/L	04/03/2012 14:48 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01737N	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015862U
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS111	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.26e-01	1.0e-01	7.8e-02	PCI/L	04/03/2012 14:55 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01761N	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS97	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226 *	1.96e-01	1.2e-01	9.6e-02	PCI/L	04/04/2012 13:42 CDT

* An asterisk indicates a result that may be significantly under or overestimated

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01762P	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS98	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	6.18e-02	7.0e-02	6.7e-02	PCI/L	04/04/2012 13:42 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01763Q	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS101	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	3.93e-02	7.0e-02	1.1e-01	PCI/L	04/04/2012 13:41 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01763Q	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS100	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.28e-01	1.1e-01	1.1e-01	PCI/L	04/04/2012 13:46 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01777X	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS102	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	8.11e-02	8.0e-02	7.0e-02	PCI/L	04/04/2012 13:44 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01778Y	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS103	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	3.33e-01	1.5e-01	6.9e-02	PCI/L	04/04/2012 14:58 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01779Z	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS104	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226 *	8.29e-01	2.5e-01	1.3e-01	PCI/L	04/04/2012 13:42 CDT

* An asterisk indicates a result that may be significantly under or overestimated

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01780R	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015868A
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/05/2012 14:59	1000.0	AS105	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	8.05e-01	2.4e-01	6.8e-02	PCI/L	04/04/2012 13:42 CDT

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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01781T	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015872W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS121	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.48e-01	1.1e-01	1.2e-01	PCI/L	04/05/2012 11:50 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01782U	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015872W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS122	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	2.07e-01	1.2e-01	9.4e-02	PCI/L	04/05/2012 11:20 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
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SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01783V	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015872W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS123	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.34e-01	1.0e-01	8.8e-02	PCI/L	04/05/2012 11:44 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01784W	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015872W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS124	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.40e-01	1.0e-01	9.2e-02	PCI/L	04/05/2012 11:43 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01785X	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015872W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS125	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	1.36e-01	1.0e-01	9.0e-02	PCI/L	04/05/2012 11:11 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	B2.01877A	QC batch #:	0008615C
Matrix:	WATER-DRINKING	Assay batch #:	0015872W
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.000e-01 L	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS127	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	2.07e-01	1.2e-01	8.6e-02	PCI/L	04/05/2012 11:30 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	LCS-00634903F	QC batch #:	0008615C
Matrix:	N/A	Assay batch #:	0015872W
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/06/2012 11:52	1000.0	AS128	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	3.46e+00	3.7e-01	1.3e-02	PCI	04/05/2012 11:18 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG #1100248

SAMPLE ANALYSIS REPORT

Sample #:	RBK-00634902E	QC batch #:	0008615C
Matrix:	N/A	Assay batch #:	0015862U
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL RA226-EICHRO
Dry/wet weight:	N/A	Analyst:	PH
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

COUNTING INFORMATION

Date and time	Duration (min)	Detector ID	Operator
04/04/2012 16:13	1000.0	AS112	RCL

ANALYTICAL RESULTS

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Ra226	3.41e-03	9.9e-03	1.5e-02	PCI	04/03/2012 14:50 CDT

**U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

SDG 1100248

QC BATCH SUMMARY

QC batch #: 0008615C
Preparation procedure: N/A
Analysis procedure: NAREL RA226-EICHROM

NAREL Sample #	QC Type	Yield (%)	$\pm 2 \sigma$ Uncertainty (%)	Analyst
B2.01731G	DUP	91.28 %	8.29 %	PH
B2.01732H		91.05 %	7.21 %	PH
B2.01733J		89.76 %	8.23 %	PH
B2.01734K		88.01 %	8.26 %	PH
B2.01735L		92.89 %	8.39 %	PH
B2.01736M		96.34 %	8.78 %	PH
B2.01737N		79.73 %	7.71 %	PH
B2.01761N		84.36 %	8.08 %	PH
B2.01762P		91.02 %	8.47 %	PH
B2.01763Q		84.98 %	8.16 %	PH
B2.01763Q		74.75 %	7.52 %	PH
B2.01777X		89.84 %	8.51 %	PH
B2.01778Y		89.81 %	8.56 %	PH
B2.01779Z		86.17 %	8.18 %	PH
B2.01780R		87.16 %	8.17 %	PH
B2.01781T		85.97 %	8.40 %	PH
B2.01782U		84.24 %	8.18 %	PH
B2.01783V		89.44 %	8.55 %	PH
B2.01784W		89.05 %	8.65 %	PH
B2.01785X		90.34 %	8.63 %	PH
B2.01877A		93.06 %	8.80 %	PH
LCS-00634903F *	LCS	88.29 %	8.41 %	PH
RBK-00634902E *	RBK	83.23 %	7.89 %	PH

* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

**National Air and Radiation Environmental Laboratory
QC Batch Report**

QC Batch #: 0008615C

Analytical Method: NAREL RA226-EICHROM

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date	Flags
00634902E	RA226	$3.41e-03 \pm 9.9e-03$	2012-04-03	OK

LABORATORY DUPLICATES (PCI/L)

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
B2.01763Q	RA226	$3.93e-02 \pm 7.0e-02$	$1.28e-01 \pm 1.1e-01$	105.75	1.35 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
00634903F	RA226	$3.37e+00 \pm 3.4\%$	$3.46e+00 \pm 3.7e-01$	102.88	0.50 OK

Analyst:

Pat Honsa
Honsa, Patricia

10 Apr 2012

QA Officer:

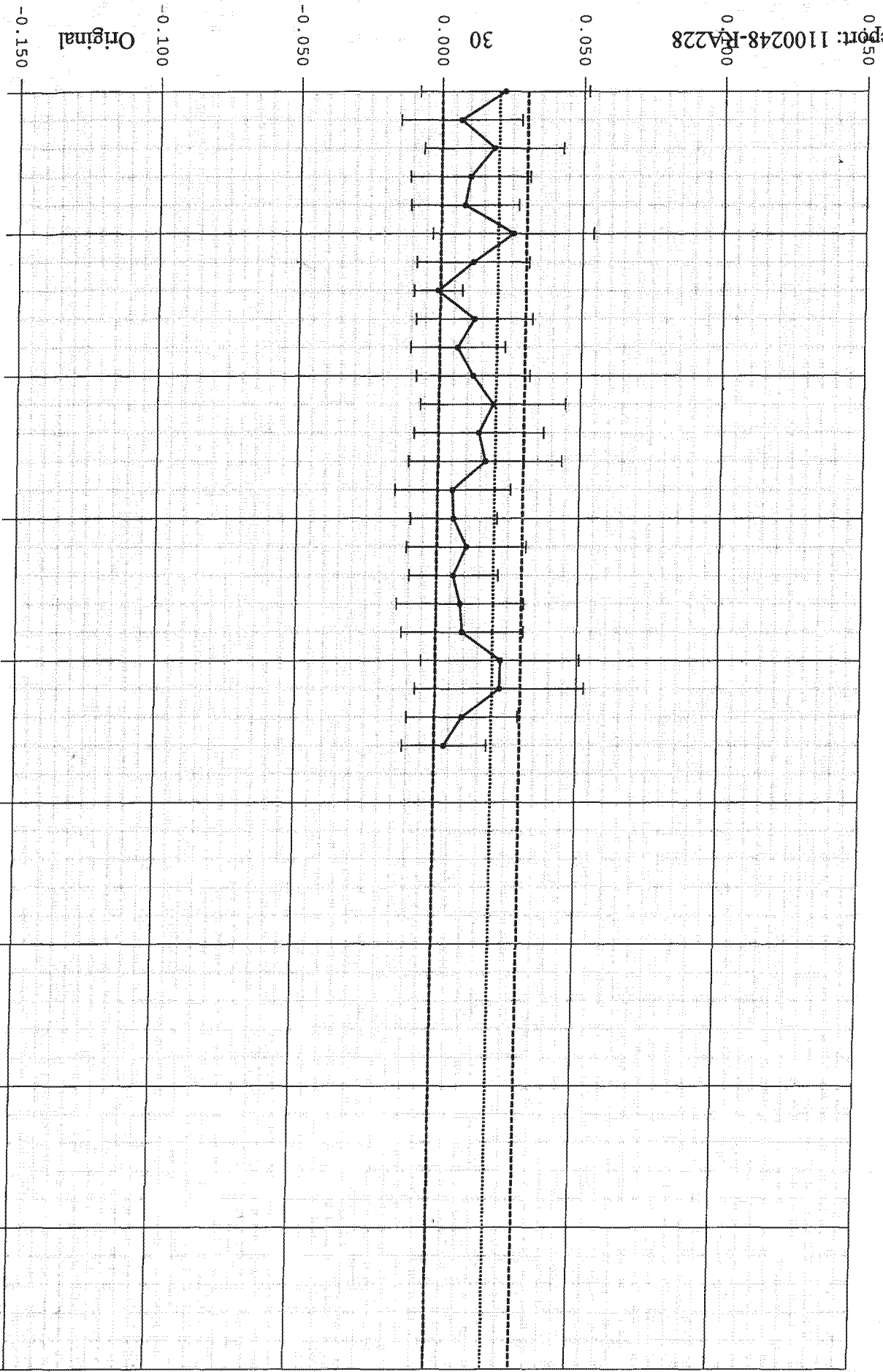
Kimberly McLean

4/10/12

Method Blanks
Analyte: RA226
Method: NAREL RA226-EICHRM
Analyst: Honsa, Patricia
PU 10 Apr 2012

DIM0273682

Report: 1100248-RA228



Original

0.030
0.020
0.000

DIM0273711